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PD-200035 (BOE 0117 PA)

REMARKS

The Office Action dated July 7, 2003, was carefully reviewed. It is respectfully requested the Examiner reconsider the present application in light of the above amendments and the remarks herein.

The specification has been amended to correct several grammatical errors. It is respectfully submitted that no new matter has been entered as a result of these amendments. Claims 12 and 20 have been amended to correct spelling errors.

The Examiner rejected claims 1, 2, 3, 5, 9, 10, 12, 13, 14, 15, 17 and 20 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,285,251 to Dent et al. (hereinafter Dent).

Independent claims 1 and 14 require first and second variable gain amplifiers having adjustable gains to amplify I and Q signals respectively. It is respectfully asserted that the Dent reference does not teach or disclose variable gain amplifiers having adjustable gain. The Dent reference discloses saturated power amplifiers whose output depends on the varying amplitude of the input signal, a control signal, and a modulated power supply.

Furthermore, the Dent reference does not teach or disclose a RF power detector coupled to and receiving the RF input signal. In the present invention, the RF power detector generates a RF power signal that corresponds to the power of the RF input signal and it is coupled to the controller. Dent does not teach or disclose this aspect of the present invention. In Figure 16, the controller received the split signal, but does not receive a power signal corresponding to the power of the RF input signal as taught by the applicants of the present invention. Therefore, it is respectfully requested the Examiner withdraw the rejection of claims under 35 U.S.C. § 102(e).

The Examiner rejected claims 4, 6, 11, 16, 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Dent in view of U.S. Patent No. 6,049,251 to Meyer. It is respectfully asserted that the claims currently pending in the application are patentable over the references cited by the Examiner.

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The present invention is directed to the problem of non-variable linearizers that are heavy and have poor electrical performance. To overcome these drawbacks, the present invention proposes a linearizer having reduced size and mass, with improved electrical performance, that also offers the advantage of modifiable gain characteristics.

In order to accomplish these objectives, the present invention teaches a bipolar transistor-based linearizer with programmable gain and phase response. The bipolar transistor-based linearizer uses a splitter to separate incoming RF signals into two equal components; in-phase (I) and quadrature (Q). The I signal is amplified using a bipolar variable gain amplifier while the Q signal passes through a second VGA. After amplification, the signals are combined at the output using a summer to produce a predistorted signal that drives a traveling wave tube amplifier. The gains of the VGAs are controlled using an RF power detector in conjunction with a bipolar gain/phase slope controller. Each gain can be adjusted separately to produce a large range of linearization characteristics.

The Dent reference is directed to the problem of poor efficiency due to power dissipated as heat in prior art power amplifiers. Dent proposes an amplifier that is capable of amplifying a signal of varying amplitude. In order to accomplish this objective, Dent teaches amplifying a signal of varying amplitude by first producing a first output signal having constant amplitude. The signal of varying amplitude is also amplified in a second saturated power amplifier that operates from a modulated voltage power supply to produce a second output signal of amplitude that depends on the signal of varying amplitude, a modulated power supply voltage, and an invert/noninvert control signal. The first and second output signals are combined into a load to amplify the signal of varying amplitude.

The teachings of Dent are directed to the efficiency of the amplifier and are not directed to the size and weight of a linearizer. Therefore, one skilled in the art would not consider Dent a reference of interest in attempting to reduce the size and weight of a linearizer used to correct for gain compression

and phase variation in traveling wave tube amplifiers and solid state power amplifiers as taught by the applicants of the present invention.

Furthermore, Dent teaches and discloses saturated power amplifiers and not Variable Gain Amplifiers (VGAs) as taught by the applicants of the present invention. The saturated power amplifiers disclosed in Dent are responsive to the input signal of varying amplitude, a control signal, and a modulated power supply. While the input signal has varying amplitude, the gain of the amplifier is not adjustable as taught by the applicants of the present invention.

The Examiner suggested the Meyer reference discloses a variable gain amplifier with a gain controller having a common emitter amplifier and a plurality of bipolar devices. However, even if this reference were combined with the Dent reference, the combination would not result in the Applicants' invention. Inserting the VGA disclosed in Meyer into the Dent reference would still require substantial modifications to meet the novelty of the applicants' invention. For example, the issue of the RF power detector coupled to the RF input and the controller coupled to the RF power detector that is taught by the present invention, still remains.

It is respectfully requested the Examiner withdraw the rejection of claims under 35 U.S.C. § 103.

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Should the Examiner have any questions or comments that may place this application in better condition for allowance, he is respectfully requested to call the undersigned attorney.

Respectfully submitted,

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